

Claims

[c1] Apparatus for assembling a plurality of storage media carriers into a single assembly, the apparatus including:

- a first magazine adapted to retain a plurality of carriers in a stack;
- a carrier depositor associated with the magazine for individually releasing a lower-most positioned carrier from said magazine;
- a conveyor system having at least a first conveyor adapted to receive carriers from the magazine as released by said depositor and to convey a plurality of carriers therealong in a row having a longitudinal axis;
- a glue depositor operable to deposit glue on said carriers as they are conveyed along the conveyor;
- a source adapted to contain a plurality of cover strips;
- an applicator adapted to apply a cover slip from the source to a plurality of said carriers to contact the glue thereon, the cover slip to be applied has a longitudinal axis generally parallel to the longitudinal axis of the row of carriers and generally parallel to the direction of movement of the first conveyor; and
- a spacer mechanism adapted to space the carriers in a sequence at predetermined locations from one another

along a first conveyor portion prior to application of a respective cover to carriers at the applicator.

- [c2] An apparatus as set forth in claim 1 wherein the conveyor system is operable to move the carriers in a generally straight line from the magazine and through the glue depositor and applicator.
- [c3] An apparatus as set forth in claim 2 wherein the spacer mechanism includes a plurality of ears mounted to said first conveyor and spaced apart along at least a portion of the length of the first conveyor, said ears being adapted to engage an edge of a respective carrier and thereby spacing said carriers at said predetermined locations along an upper run of the first conveyor.
- [c4] An apparatus as set forth in claim 3 wherein said ears are adapted to engage a respective trailing edge of a respective carrier to push said carriers in the direction of movement of the upper run of the first conveyor carrying said carriers at least some of said ears having a height less than the thickness of the carriers and at least some of said ears having a height greater than the thickness of the carriers.
- [c5] An apparatus as set forth in claim 1 wherein the carrier depositor includes a first mechanism to assist gravity in-

duced downward movement of a lower-most positioned carrier in the magazine.

- [c6] An apparatus as set forth in claim 5 wherein the first mechanism includes an airflow device operable to induce a pressure differential across top and bottom surfaces of a lower-most positioned carrier.
- [c7] An apparatus as set forth in claim 6 wherein the airflow device includes a negative pressure applicator positioned beneath said magazine and operable to reduce the atmospheric pressure below a lower-most positioned carrier.
- [c8] An apparatus as set forth in claim 7 wherein the carrier depositor includes at least one power operated extendable and retractable finger selectively underlying a lower-most positioned carrier to selectively prevent downward movement of the lower-most positioned carrier and when retracted, release said lower-most positioned carrier for downward movement thereof to the conveyor system.
- [c9] An apparatus as set forth in claim 8 wherein the carrier depositor includes a carrier retainer operable to prevent the carriers above a lower-most positioned carrier from being released to the conveyor when a lower-most car-

rier is released.

- [c10] An apparatus as set forth in claim 9 wherein the carrier retainer includes a foot connected to a drive operable to selectively move said foot into and out of engagement with at least one carrier positioned above the lower-most positioned carrier during at least a portion of the time the lower-most carrier is being released from the first magazine.
- [c11] An apparatus as set forth in claim 2 wherein the conveyor system includes a second conveyor positioned to receive released carriers thereon and operable to transfer released carriers to the first conveyor.
- [c12] An apparatus as set forth in claim 11 wherein the spacer mechanism includes a plurality of ears mounted on the second conveyor and operable to engage a respective trailing edge of a carrier to fix the positions of the carriers relative to the second conveyor and to carriers in a group of carriers, said group of carriers being adapted to be attached to a respective cover strip.
- [c13] An apparatus as set forth in claim 12 wherein said second conveyor includes at least two conveyor tracks with at least a portion of each conveyor track positioned outside of a respective side edge of the first conveyor.

- [c14] An apparatus as set forth in claim 13 including a control device operable to control the time of release of a lower-most carrier in relation to the position of a respective said ear.
- [c15] An apparatus as set forth in claim 14 including an airflow device operable to induce a pressure differential across top and bottom surfaces of a lower-most positioned carrier, said airflow device having an inlet end positioned below at least a portion of an upper run of each of the at least two conveyor tracks to prevent said airflow device from contacting carriers on the second conveyor.
- [c16] An apparatus as set forth in claim 1 including a mechanism adapted to prevent glue from trailing at the glue depositor after deposition on a carrier as the carrier moves from the glue depositor.
- [c17] An apparatus as set forth in claim 16 wherein the mechanism includes a source of hot air directed at a glue outlet on the glue depositor.
- [c18] A method of making an assembly of a connected series of carriers adapted to hold digital data devices, said method including:
 - depositing a plurality of carriers on a conveyor, said carriers each being deposited from a bottom of a stack of

said carriers, said carriers being in a row and spaced apart from each other predetermined distances after depositing;

conveying said carriers in a row on a conveyor system in a generally straight line path after depositing through a plurality of stations;

depositing glue on said carriers at selected locations on the carriers at a first said station;

applying a carrier strip to a selected group of said carriers at a second said station; and

adhesively securing the cover strip to its respective group of carriers, said carrier strip having its longitudinal axis generally parallel to said straight line path.

[c19] A method as set forth in claim 18 including storing cover strips in a stack with the longitudinal axes of the stored carrier strips being generally parallel to the path.

[c20] A method as set forth in claim 19 wherein at least some of the carriers attached to a carrier strip are spaced from an adjacent carrier along the longitudinal axis of the carrier strip wherein a portion of the carrier strip between adjacent carriers forms a bridge between adjacent carriers.

[c21] A method as set forth in claim 18 including applying an air pressure differential to a carrier prior to depositing

said carrier on the conveyor.

- [c22] A method as set forth in claim 21 wherein the pressure differential is induced by reducing the pressure from atmospheric pressure on a face of a lower-most carrier facing a portion of the conveying system under the lower-most carrier.
- [c23] A method as set forth in claim 22 including heating at least a portion of the glue from the glue depositor between the glue depositor and a carrier on which glue has been deposited after the deposition of the glue on the carrier.
- [c24] A method as set forth in Claim 18 wherein said carriers are deposited front side down, back side up and said carrier is deposited on the back sides of the carrier inside face down and outside face up.
- [c25] Apparatus for assembling a plurality of storage media carriers into a single assembly, the apparatus including:
 - a first magazine adapted to retain a plurality of carriers in a stack;
 - a carrier depositor associated with the magazine for individually releasing a lower-most positioned carrier from said magazine in a front face down orientation;
 - a conveyor system having at least a first conveyor

adapted to receive carriers from the magazine as released by said depositor and to convey a plurality of carriers therealong in a row having a longitudinal axis, said conveyor having an upper run with an exposed generally upward facing surface for receiving deposited carriers thereon, said conveyor having an infeed end and an out-feed end;

a glue depositor downstream of the depositor operable to deposit glue on said carriers as they are conveyed along the conveyor;

a source downstream of the depositor adapted to contain a plurality of cover strips; and

an applicator downstream of the depositor adapted to apply a cover strip from the source to generally upwardly facing backs of a plurality of said carriers to contact the glue thereon, the cover slip to be applied has a longitudinal axis of the row of carriers and generally parallel to the direction of movement of the first conveyor.

- [c26] An apparatus as set forth in Claim 25 including a spacer mechanism adapted to space the carriers in a sequence at predetermined locations from one another along a first conveyor portion prior to application of a respective to carriers at the applicator.
- [c27] An apparatus as set forth in Claim 26 wherein the conveyor system is operable to move the carriers in a gener-

ally straight line from the magazine and then through the glue depositor and applicator.